Feasibility Study
For
Generation Interconnection Request
GEN-2007-017

SPP Tariff Studies
(#GEN-2007-017)

February, 2008

Executive Summary

<OMITTED TEXT> (Customer) has requested a Feasibility Study for the purpose of interconnecting 100.5 MW of wind generation within the control area of Missouri Public Service (d/b/a Aquila Networks – Missouri Public Service) (MIPU) located in Nodaway County, Missouri. The proposed method of interconnection is a new 161 kV line terminal and breaker to be installed at a new ring-bus switching station to be located on the existing Maryville – Midway 161 kV transmission line, owned by MIPU. This new station was previously proposed for construction for Generation Interconnect Requests #GEN-2006-014 and #GEN-2006-017. The proposed in-service date of this request is November 30, 2009.

Power flow analysis has indicated that for the powerflow cases studied, it is possible to interconnect the 100.5 MW of generation with transmission system reinforcements within the local transmission system. In order to maintain acceptable reactive power compensation, the customer will be required to pay for the installation of a combined total of at least 18 Mvar of 34.5 kV capacitor bank(s) to be installed in the Customer's collector substation. Dynamic Stability studies performed as part of the System Impact Study will provide additional guidance as to whether the required reactive compensation can be static or a portion must be dynamic (such as a SVC).

The requirement to interconnect the 100.5 MW of wind generation into the proposed substation consists of adding a new 161 kV line terminal and breaker at a previously proposed ring-bus switching station. This new station was originally proposed for GI Requests #GEN-2006-014 and #GEN-2006-017 and will be constructed and maintained by MIPU. The Customer did not propose a specific route for the 161 kV line extending to serve its 161/34.5 kV collection facilities. It is assumed that obtaining all necessary right-of-way for the new transmission line to serve its facilities will not be a significant expense.

The total minimum cost for building the required facilities necessary to interconnect this 100.5 MW of generation is $500,000. These costs are shown in Tables 1 and 2. Depending on the status of prior queued projects, interconnection costs for this request could be as much as $5,000,000. Network constraints in the Associated Electric Cooperatives, Inc. (AECI), Kansas City Power & Light (KCPL), MidAmerican Energy Company (MEC), MIPU, and Westar Energy (WERE) transmission systems that were identified are shown in Table 3. These Network constraints will have to be verified with a Transmission Service Request (TSR) and associated studies. Network Constraints are in the local area of the new generation when this generation is sunk throughout the SPP footprint for the Energy Resource (ER) Interconnection request. With a defined source and sink in a Transmission Service Request, this list of Network Constraints will be refined and expanded to account for all Network Upgrade requirements. This cost does not include building the 161 kV line from the Customer 161/34.5 kV collector substation into the point of interconnection. This cost also does not include the Customer's 161/34.5 kV collector substation or the 34.5 kV, 14 Mvar capacitor bank(s).

In Table 4, a value of Available Transfer Capability (ATC) associated with each overloaded facility is included. These values may be used by the Customer for future analyses including the determination of lower generation capacity levels that may be installed. When transmission service associated with this interconnection is evaluated, the loading of the facilities listed in this table may be greater due to higher priority reservations. If the loading of a facility is higher, the level of ATC will be lower.

There are several other proposed generation additions in the general area of the Customer's facility. It was assumed in this preliminary analysis that not all of these other projects within the AECI, MIPU and KCPL control areas will be in service. Those previously queued projects that have advanced to nearly complete phases were included in this Feasibility Study. In the event that another request for a generation interconnection with a higher priority withdraws, then this request may have to be re-evaluated to determine the local Network Constraints.

The required interconnection costs listed in Tables 1 and 2 and other upgrades associated with Network Constraints do not include all costs associated with the deliverability of the energy to final customers. These costs are determined by separate studies if the Customer submits a Transmission Service Request through Southwest Power Pool's OASIS.

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Introduction

<OMITTED TEXT> (Customer) has requested a Feasibility Study for the purpose of interconnecting 100.5 MW of wind generation within the control area of Missouri Public Utilities (d/b/a Aquila Networks – Missouri Public Service) (MIPU) located in Nodaway County, Missouri. The proposed method of interconnection is a new 161 kV line terminal and breaker to be installed at a new ring-bus switching station to be located on the existing Maryville – Midway 161 kV transmission line, owned by MIPU. This new station was previously proposed for construction for Generation Interconnect Requests #GEN-2006-014 and #GEN-2006-017. The proposed in-service date of this request is November 30, 2009.

Interconnection Facilities

The primary objective of this study is to identify the system problems associated with connecting the generating plant to the area transmission system. The Feasibility and other subsequent Interconnection Studies are designed to identify attachment facilities, Network Upgrades and other Direct Assignment Facilities needed to accept power into the grid at the interconnection receipt point.

The requirement to interconnect the 100.5 MW of wind generation into the proposed substation consists of adding a new 161 kV line terminal and breaker at a previously proposed ring-bus switching station. This new station was originally proposed for GI Requests #GEN-2006-014 and #GEN-2006-017 and will be constructed and maintained by MIPU. The Customer did not propose a specific route for the 161 kV line extending to serve its 161/34.5 kV collection facilities. It is assumed that obtaining all necessary right-of-way for the new transmission line to serve its facilities will not be a significant expense.

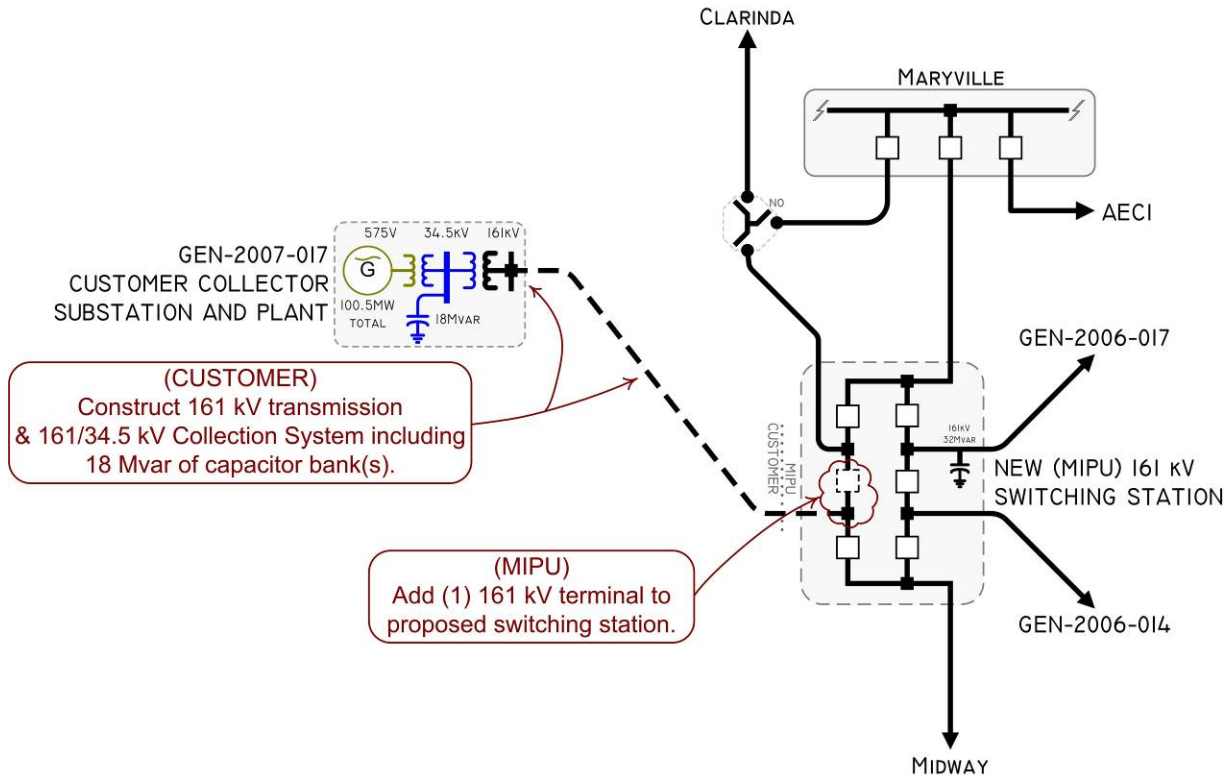

Figure 1: Proposed Method of Interconnection

(Final design to be determined)

Interconnection Estimated Costs

The minimum cost for adding a new 161 kV line terminal and breaker to the previously proposed ring-bus switching station and terminating the transmission line serving GEN-2007-017 facilities is estimated at $500,000. These costs are listed in Tables 1 and 2. These estimates will be refined during the development of the System Impact Study based on the final designs. This cost does not include building the Customer's 161 kV transmission line extending from the point of interconnection to serve its 161/34.5 kV collection facilities. This cost also does not include the Customer's 161/34.5 kV collector substation or the 18 Mvar of capacitor bank(s), all of which should be determined by the Customer. The Customer is responsible for these 161 kV – 34.5 kV facilities up to the point of interconnection. Other Network Constraints in the Associated Electric Cooperatives, Inc. (AECI), Kansas City Power & Light (KCPL), MidAmerican Energy Company (MEC), MIPU, and Westar Energy (WERE) transmission systems that were identified are shown in Table 3.

The costs listed in Tables 1 and 2 require that the previous queued projects, GEN-2006-014 and GEN-2006-017, remain in the GI queue. Should one of the prior queued projects withdraw from the queue, the costs associated with interconnecting this request will be modified to reflect those listed in the Facility Study for GEN-2006-017, which at this time has been estimated at $5,000,000. Should both prior queued projects withdraw from the GI queue, the costs associated with interconnecting this request will be modified to reflect those listed in the Facility Study for GEN-2006-014, which at this time has been estimated at $3,500,000.

These costs do not include any cost that might be associated with short circuit study results or dynamic stability study results. These costs will be determined when and if a System Impact Study is conducted.

Table 1: Direct Assignment Facilities

FACILITY	ESTIMATED COST (2008 DOLLARS)
CUSTOMER – (1) 161/34.5 kV Customer collector substation facilities.	*
CUSTOMER – (1) 161 kV transmission line from Customer collector substation to the proposed station to be located on the Maryville – Midway 161 kV transmission line.	*
CUSTOMER – 34.5 kV, 18 Mvar capacitor bank(s) to be installed in the Customer 161/34.5 kV collector substation.	*
CUSTOMER – Right-of-Way for all Customer facilities.	*
TOTAL	*****

* *Estimates of cost to be determined.*

Table 2: Required Interconnection Network Upgrade Facilities

FACILITY	ESTIMATED COST (2008 DOLLARS)
MIPU – (1) 161 kV line terminal and breaker for GI Request #GEN-2007-017.	$500,000
TOTAL	*****

* *Estimates of cost to be determined.*

Powerflow Analysis

A powerflow analysis was conducted for the facility using modified versions of the 2009 winter peak model, the 2012 summer and winter peak models, and the 2017 summer peak model. The output of the Customer's facility was offset in each model by a reduction in output of existing online SPP generation. This method allows the request to be studied as an Energy Resource (ER) Interconnection request. The proposed in-service date of the generation is November 30, 2009. The available seasonal models used were through the 2017 Summer Peak of which is the end of the current SPP planning horizon.

Following current practice, this analysis was conducted assuming that previous queued requests in the immediate area of this interconnect request were in service. The analysis of the Customer's project indicates that, given the requested generation level of 100.5 MW and location, additional criteria violations will occur on the existing AECI, KCPL, MEC, MIPU, and WERE transmission systems under steady state and contingency conditions in the peak seasons. Table 3 lists these overloaded facilities.

In Table 4, a value of Available Transfer Capability (ATC) associated with each overloaded facility is included. These values may be used by the Customer to determine lower generation capacity levels that may be installed. When transmission service associated with this interconnection is evaluated, the loading of the facilities listed in this table may be greater due to higher priority reservations. When a facility is overloaded for more than one contingency, only the highest loading on the facility for each season is included in the table.

Voltage violations for load serving buses within the SPP footprint were also observed for some of the contingencies listed in Table 3. These voltage violations have not been listed in this report.

In order to maintain a zero reactive power flow exchanged at the point of interconnection, additional reactive compensation is required. The Customer will be required to install a combined total of 18 Mvar of capacitor bank(s) in the Customer's 161/34.5 kV collector substation on the 34.5 kV bus. Dynamic Stability studies performed as part of the System Impact Study will provide additional guidance as to whether the reactive compensation can be static or a portion must be dynamic (such as a SVC or STATCOM). It is possible that an SVC or STATCOM device will be required at the Customer facility because of FERC Order 661A Low Voltage Ride-Through Provisions (LVRT) which went into effect January 1, 2006. FERC Order 661A orders that wind farms stay on-line for 3-phase faults at the point of interconnection even if that requires the installation of a SVC or STATCOM device.

There are several other proposed generation additions in the general area of the Customer's facility. Some of the local projects that were previously queued were assumed to be in service in this Feasibility Study. Not all local projects that were previously queued and have advanced to nearly complete phases were included in this Feasibility Study.

Powerflow Analysis Methodology

The Southwest Power Pool (SPP) criteria states that: “The transmission system of the SPP region shall be planned and constructed so that the contingencies as set forth in the Criteria will meet the applicable NERC Planning Standards for System Adequacy and Security – Transmission System Table l hereafter referred to as NERC Table l) and its applicable standards and measurements”.

Using the created models and the ACCC function of PSS\E, single contingencies in portions or all of the modeled control areas of Sunflower Electric Power Corporation (SUNC), Missouri Public Service (MIPU), Westar Energy (WERE), Kansas City Power & Light (KCPL), West Plains (WEPL), Midwest Energy (MIDW), Oklahoma Gas and Electric OKGE, American Electric Power West (AEPW), Grand River Dam Authority (GRDA), Southwestern Public Service Company (SPS), Western Farmers Electric Cooperative (WFEC) and other control areas were applied and the resulting scenarios analyzed. This satisfies the ‘more probable’ contingency testing criteria mandated by NERC and the SPP criteria.

Powerflow Results

Table 3: Network Constraints

AREA	OVERLOADED ELEMENT
AECI	FAIRPORT - OSBORN 161KV CKT 1
AECI	MARYVILLE - SKIDMORE 69KV CKT 1
AECI	MARYVILLE (MARYVILL) 161/69/13.8KV TRANSFORMER CKT 1
AECI	MARYVILLE (MARYVILL) 161/69/13.8KV TRANSFORMER CKT 2
AECI	MOBERLY TAP - THOMAS HILL 161KV CKT 1
AECI/MIPU	MARYVILLE - MARYVILLE 161KV CKT 1
KCPL	HAWTHORN (HAWT 20) 345/161/13.2KV TRANSFORMER CKT 20
KCPL	LEEDS - LEEDS REACTOR 161KV CKT 1
KCPL	MIDTOWN - MIDTOWN REACTOR 161KV CKT 1
KCPL	MIDTOWN REACTOR - LEEDS REACTOR 161KV CKT 1
KCPL	STILWELL 345/161KV TRANSFORMER CKT 1
KCPL/MIPU	ALABAMA - NASHUA 161KV CKT 1
KCPL/MIPU	HAWTHORN - ST JOE 345KV CKT 1
KCPL/MIPU	ST JOE - IATAN 345KV CKT 1
KCPL/WERE	IATAN - STRANGER CREEK 345KV CKT 1
MEC	PINNACLE TAP - CLRNDA 5 161.00 161KV CKT 1
MEC/MIPU	CLRNDA 5 161.00 - MARYVLE2-NEW161.00 161KV CKT 1
MIPU	ALABAMA - LAKE ROAD 161KV CKT 1
MIPU	BLUE SPRINGS EAST - DUNCAN ROAD 161KV CKT 1
MIPU	HALLMARK - RITCHFIELD 161KV CKT 1
MIPU	MARYVLE2-NEW161.00 - MIDWAY 161KV CKT 1
MIPU	MIDWAY - ST JOE 161KV CKT 1
MIPU	SIBLEY - RITCHFIELD 161KV CKT 1
WERE	ANZIO - FORT JUNCTION SWITCHING STATION 115KV CKT 1
WERE	EAST MANHATTAN (EMANHT3X) 230/115/18.0KV TRANSFORMER CKT 1
WERE	EXIDE JUNCTION - NORTH AMERICAN PHILIPS 115KV CKT 1
WERE	EXIDE JUNCTION - SUMMIT 115KV CKT 1
WERE	FORT JUNCTION SWITCHING STATION - MCDOWELL CREEK SWITCHING STATION 115KV CKT 1
WERE	NORTHVIEW - SUMMIT 115KV CKT 1
AECI	Associated Electric Cooperative Inc.
KCPL	Kansas City Power and Light
MEC	MidAmerican Energy Company
MIPU	Missouri Public Service
WERE	Westar Energy

Table 4: Contingency Analysis

SEASON	OVERLOADED ELEMENT	RATING (MVA)	LOADING (%)	ATC (MW)	CONTINGENCY
09WP	MARYVILLE - MARYVILLE 161KV CKT 1	200	209	0	CLRNDA 5 161.00 - MARYVLE2-NEW161.00 161KV CKT 1
09WP	MARYVLE2-NEW161.00 - MIDWAY 161KV CKT 1	182	184	0	MARYVILLE - MARYVLE2-NEW161.00 161KV CKT 1
09WP	MIDWAY - ST JOE 161KV CKT 1	182	175	0	MARYVILLE - MARYVLE2-NEW161.00 161KV CKT 1
09WP	CLRNDA 5 161.00 - MARYVLE2-NEW161.00 161KV CKT 1	192	162	0	MARYVILLE - MARYVLE2-NEW161.00 161KV CKT 1
09WP	MARYVILLE (MARYVILL) 161/69/13.8KV TRANSFORMER CKT 1	30	135	0	MARYVILLE (MARYVILL) 161/69/13.8KV TRANSFORMER CKT 2
09WP	ALABAMA - LAKE ROAD 161KV CKT 1	153	123	0	HAWTHORN - ST JOE 345KV CKT 1
09WP	MARYVILLE (MARYVILL) 161/69/13.8KV TRANSFORMER CKT 2	50	119	0	MARYVILLE (MARYVILL) 161/69/13.8KV TRANSFORMER CKT 1
09WP	ALABAMA - NASHUA 161KV CKT 1	153	114	0	HAWTHORN - ST JOE 345KV CKT 1
12SP	ALABAMA - LAKE ROAD 161KV CKT 1	153	236	0	IATAN - STRANGER CREEK 345KV CKT 1
12SP	ALABAMA - NASHUA 161KV CKT 1	153	224	0	IATAN - STRANGER CREEK 345KV CKT 1
12SP	MARYVILLE - MARYVILLE 161KV CKT 1	200	206	0	CLRNDA 5 161.00 - MARYVLE2-NEW161.00 161KV CKT 1
12SP	MARYVLE2-NEW161.00 - MIDWAY 161KV CKT 1	182	196	0	MARYVILLE - MARYVLE2-NEW161.00 161KV CKT 1
12SP	MIDWAY - ST JOE 161KV CKT 1	182	185	0	MARYVILLE - MARYVLE2-NEW161.00 161KV CKT 1
12SP	CLRNDA 5 161.00 - MARYVLE2-NEW161.00 161KV CKT 1	192	169	0	MARYVILLE - MARYVLE2-NEW161.00 161KV CKT 1
12SP	MARYVILLE (MARYVILL) 161/69/13.8KV TRANSFORMER CKT 1	30	154	0	MARYVILLE (MARYVILL) 161/69/13.8KV TRANSFORMER CKT 2
12SP	MARYVILLE (MARYVILL) 161/69/13.8KV TRANSFORMER CKT 2	50	147	0	SPP-KCPL-02: LAKE ROAD-NASHUA 161KV CKT 1, IATAN - STRANGER CREEK 345KV CKT 1
12SP	ANZIO - FORT JUNCTION SWITCHING STATION 115KV CKT 1	92	141	0	SPP-WERE-46: FT JUNCTION SWITCHING STATION - WEST JUNCTION CITY JUNCTION (EAST) 115KV CKT 1, FT JUNCTION SWITCHING STATION - WEST JUNCTION CITY JUNCTION (EAST) 115KV CKT 2, WEST JUNCTION CITY - WEST JUNCTION CITY JUNCTION (EAST) 115KV CKT 1.
12SP	HAWTHORN - ST JOE 345KV CKT 1	1138	131	0	SPP-KCPL-02: LAKE ROAD-NASHUA 161KV CKT 1, IATAN - STRANGER CREEK 345KV CKT 1
12SP	NORTHVIEW - SUMMIT 115KV CKT 1	181	124	0	EXIDE JUNCTION - SUMMIT 115KV CKT 1
12SP	FORT JUNCTION SWITCHING STATION - MCDOWELL CREEK SWITCHING STATION 115KV CKT 1	68	123	0	FORT JUNCTION SWITCHING STATION - MCDOWELL CREEK SWITCHING STATION 115KV CKT 3
12SP	FAIRPORT - OSBORN 161KV CKT 1	227	121	0	SPP-KCPL-02: LAKE ROAD-NASHUA 161KV CKT 1, IATAN - STRANGER CREEK 345KV CKT 1
12SP	MOBERLY TAP - THOMAS HILL 161KV CKT 1	372	119	0	AI21: THOMAS HILL - MCCREDIE 345KV CKT 1, MCREDIE - KINGDOM CITY 345KV CKT 1
12SP	HAWTHORN (HAWT 20) 345/161/13.2KV TRANSFORMER CKT 20	550	116	0	SPP-KCPL-02B: ALABAMA - LAKE ROAD 161KV CKT 1, IATAN - STRANGER CREEK 345KV CKT 1
12SP	IATAN - STRANGER CREEK 345KV CKT 1	1195	115	0	SPP-KCPL-01A: HAWTHORN - ST JOE 345KV CKT 1, ALABAMA - LAKE ROAD 161KV CKT 1
12SP	EXIDE JUNCTION - SUMMIT 115KV CKT 1	196	114	0	NORTHVIEW - SUMMIT 115KV CKT 1
12SP	MARYVILLE - SKIDMORE 69KV CKT 1	51	114	0	SPP-KCPL-02: LAKE ROAD-NASHUA 161KV CKT 1, IATAN - STRANGER CREEK 345KV CKT 1

TABLE 4: Contingency Analysis (continued)

SEASON	OVERLOADED ELEMENT	RATING (MVA)	LOADING (%)	ATC (MW)	CONTINGENCY
12SP	EXIDE JUNCTION - NORTH AMERICAN PHILIPS 115KV CKT 1	196	108	0	NORTHVIEW - SUMMIT 115KV CKT 1
12SP	EAST MANHATTAN (EMANHT3X) 230/115/18.0KV TRANSFORMER CKT 1	308	103	0	MCDOWELL CREEK - MORRIS COUNTY 230KV CKT 1
12SP	PINNACLE TAP - CLRNDA 5 161.00 161KV CKT 1	146	104	70	MARYVILLE - MARYVLE2-NEW161.00 161KV CKT 1
12WP	MARYVILLE - MARYVILLE 161KV CKT 1	200	215	0	CLRNDA 5 161.00 - MARYVLE2-NEW161.00 161KV CKT 1
12WP	MARYVLE2-NEW161.00 - MIDWAY 161KV CKT 1	182	189	0	MARYVILLE - MARYVLE2-NEW161.00 161KV CKT 1
12WP	MIDWAY - ST JOE 161KV CKT 1	182	180	0	MARYVILLE - MARYVLE2-NEW161.00 161KV CKT 1
12WP	CLRNDA 5 161.00 - MARYVLE2-NEW161.00 161KV CKT 1	192	179	0	MARYVILLE - MARYVLE2-NEW161.00 161KV CKT 1
12WP	ALABAMA - LAKE ROAD 161KV CKT 1	153	178	0	IATAN - STRANGER CREEK 345KV CKT 1
12WP	ALABAMA - NASHUA 161KV CKT 1	153	168	0	IATAN - STRANGER CREEK 345KV CKT 1
12WP	MARYVILLE (MARYVILL) 161/69/13.8KV TRANSFORMER CKT 1	30	139	0	MARYVILLE (MARYVILL) 161/69/13.8KV TRANSFORMER CKT 2
12WP	ST JOE - IATAN 345KV CKT 1	1073	129	0	SPP-KCPL-02B: ALABAMA - LAKE ROAD 161KV CKT 1, IATAN - STRANGER CREEK 345KV CKT 1
12WP	MARYVILLE (MARYVILL) 161/69/13.8KV TRANSFORMER CKT 2	50	121	0	MARYVILLE (MARYVILL) 161/69/13.8KV TRANSFORMER CKT 1
12WP	MOBERLY TAP - THOMAS HILL 161KV CKT 1	386	117	0	AI21: THOMAS HILL - MCCREDIE 345KV CKT 1, MCREDIE - KINGDOM CITY 345KV CKT 1
12WP	HAWTHORN - ST JOE 345KV CKT 1	1138	105	0	SPP-KCPL-02B: ALABAMA - LAKE ROAD 161KV CKT 1, IATAN - STRANGER CREEK 345KV CKT 1
12WP	BLUE SPRINGS EAST - DUNCAN ROAD 161KV CKT 1	275	102	0	PLEASANT HILL () 345/161/13.8KV TRANSFORMER CKT 1
17SP	MARYVILLE - MARYVILLE 161KV CKT 1	200	213	0	CLRNDA 5 161.00 - MARYVLE2-NEW161.00 161KV CKT 1
17SP	ALABAMA - LAKE ROAD 161KV CKT 1	153	210	0	IATAN - STRANGER CREEK 345KV CKT 1
17SP	ALABAMA - NASHUA 161KV CKT 1	153	198	0	IATAN - STRANGER CREEK 345KV CKT 1
17SP	MARYVLE2-NEW161.00 - MIDWAY 161KV CKT 1	182	178	0	MARYVILLE - MARYVLE2-NEW161.00 161KV CKT 1
17SP	CLRNDA 5 161.00 - MARYVLE2-NEW161.00 161KV CKT 1	192	172	0	MARYVILLE - MARYVLE2-NEW161.00 161KV CKT 1
17SP	MIDWAY - ST JOE 161KV CKT 1	182	168	0	MARYVILLE - MARYVLE2-NEW161.00 161KV CKT 1
17SP	MARYVILLE (MARYVILL) 161/69/13.8KV TRANSFORMER CKT 1	30	167	0	MARYVILLE (MARYVILL) 161/69/13.8KV TRANSFORMER CKT 2
17SP	ST JOE - IATAN 345KV CKT 1	1073	151	0	SPP-KCPL-02B: ALABAMA - LAKE ROAD 161KV CKT 1, IATAN - STRANGER CREEK 345KV CKT 1
17SP	MARYVILLE (MARYVILL) 161/69/13.8KV TRANSFORMER CKT 2	50	148	0	SPP-KCPL-02B: ALABAMA - LAKE ROAD 161KV CKT 1, IATAN - STRANGER CREEK 345KV CKT 1
17SP	SIBLEY - RITCHFIELD 161KV CKT 1	223	122	0	SPP-KCPL-02B: ALABAMA - LAKE ROAD 161KV CKT 1, IATAN - STRANGER CREEK 345KV CKT 1
17SP	HALLMARK - RITCHFIELD 161KV CKT 1	223	117	0	SPP-KCPL-02B: ALABAMA - LAKE ROAD 161KV CKT 1, IATAN - STRANGER CREEK 345KV CKT 1
17SP	HAWTHORN - ST JOE 345KV CKT 1	1138	116	0	SPP-KCPL-02B: ALABAMA - LAKE ROAD 161KV CKT 1, IATAN - STRANGER CREEK 345KV CKT 1
17SP	STILLWELL 345/161KV TRANSFORMER CKT 1	557	115	0	MCCREDIE - THOMAS HILL 345KV CKT 1
17SP	MARYVILLE - SKIDMORE 69KV CKT 1	51	114	0	SPP-KCPL-02B: ALABAMA - LAKE ROAD 161KV CKT 1, IATAN - STRANGER CREEK 345KV CKT 1

TABLE 4: Contingency Analysis (continued)

SEASON	OVERLOADED ELEMENT	RATING (MVA)	LOADING (%)	ATC (MW)	CONTINGENCY
17SP	HAWTHORN (HAWT 20) 345/161/13.2KV TRANSFORMER CKT 20	550	112	0	SPP-KCPL-02B: ALABAMA - LAKE ROAD 161KV CKT 1, IATAN - STRANGER CREEK 345KV CKT 1
17SP	FAIRPORT - OSBORN 161KV CKT 1	227	109	0	SPP-KCPL-02B: ALABAMA - LAKE ROAD 161KV CKT 1, IATAN - STRANGER CREEK 345KV CKT 1
17SP	MOBERLY TAP - THOMAS HILL 161KV CKT 1	372	106	0	AI21: THOMAS HILL - MCCREDIE 345KV CKT 1, MCREDIE - KINGDOM CITY 345KV CKT 1
17SP	IATAN - STRANGER CREEK 345KV CKT 1	1195	103	0	SPP-KCPL-01A: ALABAMA - LAKE ROAD 161KV CKT 1, HAWTHORN - ST JOE 345KV CKT 1
17SP	LEEDS - LEEDS REACTOR 161KV CKT 1	223	102	19	SPP-KCPL-02B: ALABAMA - LAKE ROAD 161KV CKT 1, IATAN - STRANGER CREEK 345KV CKT 1
17SP	MIDTOWN - MIDTOWN REACTOR 161KV CKT 1	223	102	19	SPP-KCPL-02B: ALABAMA - LAKE ROAD 161KV CKT 1, IATAN - STRANGER CREEK 345KV CKT 1
17SP	MIDTOWN REACTOR - LEEDS REACTOR 161KV CKT 1	223	102	19	SPP-KCPL-02B: ALABAMA - LAKE ROAD 161KV CKT 1, IATAN - STRANGER CREEK 345KV CKT 1
17SP	CLRNDA 5 161.00 - MARYVLE2-NEW161.00 161KV CKT 1	167	103	75	BASE CASE

Note: When transmission service associated with this interconnection is evaluated, the loading of the facilities listed in this table may be greater due to higher priority reservations. If the loading of a facility is higher, the level of ATC will be lower.

Conclusion

The minimum cost of interconnecting the Customer's interconnection request is estimated at $500,000 for Direct Assignment Facilities and Network Upgrades. Depending on the status of prior queued projects, interconnection costs for this request could be as much as $5,000,000. At this time, the cost estimates for other Direct Assignment facilities including those in Tables 1 and 2 have not been defined by the Customer. In addition to the Customer's proposed interconnection facilities, the Customer will be responsible for installing a total of 18 Mvar of capacitor bank(s) in the Customer's substation for reactive support. As stated earlier, some but not all of the local projects that were previously queued are assumed to be in service in this Feasibility Study. These costs exclude upgrades of other transmission facilities that were listed in Table 3 of which are Network Constraints.

In Table 4, a value of Available Transfer Capability (ATC) associated with each overloaded facility is included. These values may be used by the Customer to determine lower generation capacity levels that may be installed. When transmission service associated with this interconnection is evaluated, the loading of the facilities listed in this table may be greater due to higher priority reservations. When a facility is overloaded for more than one contingency, only the highest loading on the facility for each season is included in the table.

These interconnection costs do not include any cost that may be associated with short circuit or transient stability analysis. These studies will be performed if the Customer signs a System Impact Study Agreement. At the time of the System Impact Study, a better determination of the interconnection facilities may be available.

The required interconnection costs listed in Tables 1 and 2 and other upgrades associated with Network Constraints do not include all costs associated with the deliverability of the energy to final customers. These costs are determined by separate studies if the Customer submits a Transmission Service Request through Southwest Power Pool's OASIS.

Appendix A: Point of Interconnection Area Map

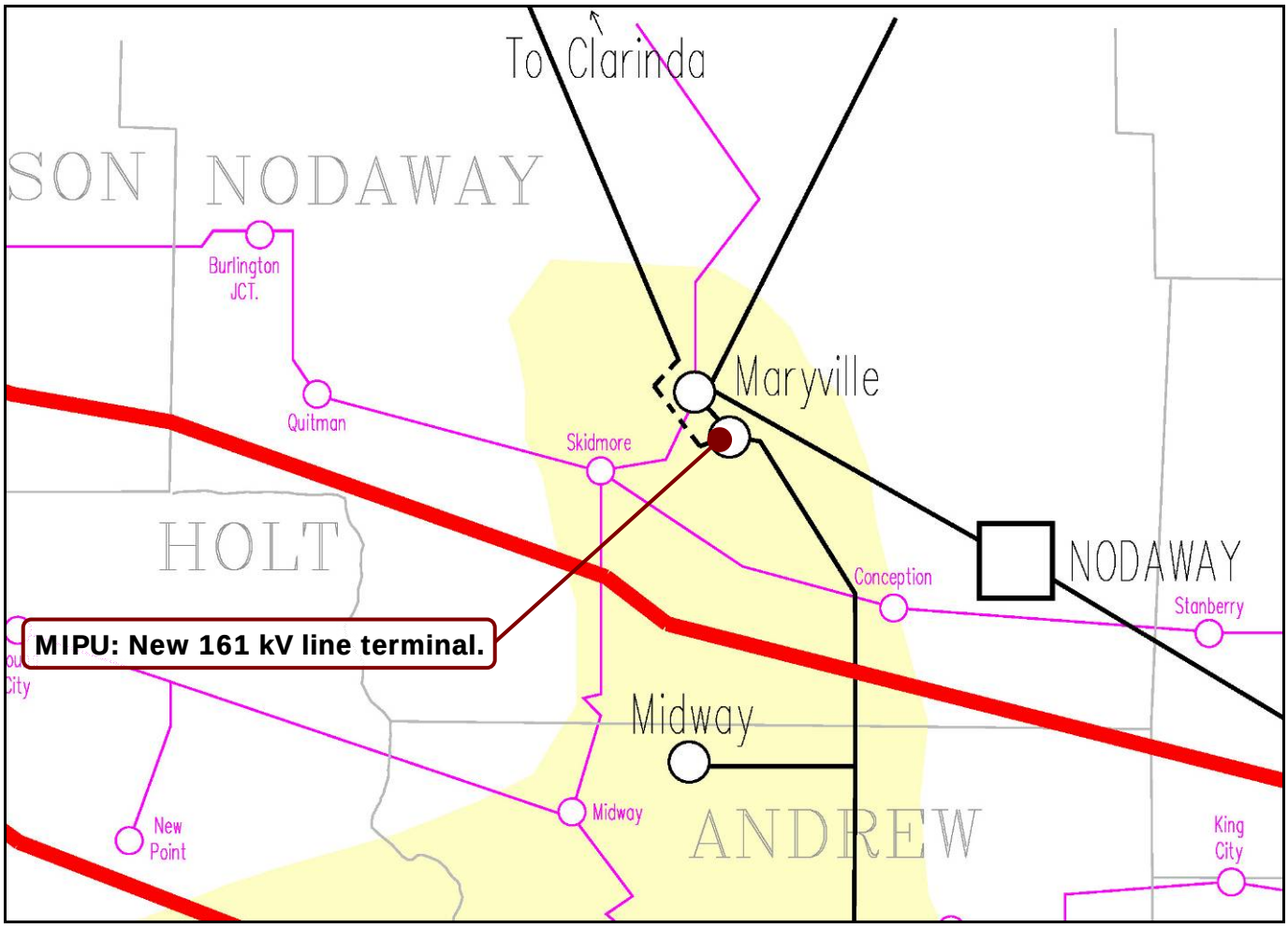

Figure 2: Point of Interconnection Area Map